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- (84) 指定国 (広域): ARIPO 特許 (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), ユーラシア特許 (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), ヨーロッパ特許 (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI 特許 (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
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— 国際調査報告書
- 2文字コード及び他の略語については、定期発行される各PCTガゼットの巻頭に掲載されている「コードと略語のガイダンスノート」を参照。

(54) Title: FUEL CELL-USE HUMIDIFIER

(54) 発明の名称: 燃料電池用加湿装置

(57) Abstract: A humidifier capable of increasing a humidifying efficiency with a gas pressure loss restricted even a low-pressure gas is used, and being suitably used for a fuel cell. A fuel cell-use humidifier comprising a hollow yarn membrane element mounted in a container so as to separate a space leading to the hollow side of a hollow yarn membrane from a space leading to the outer side of the hollow yarn membrane, characterized in that (a) the inner diameter of the hollow yarn membrane is larger than 400  $\mu\text{m}$ , (b) the water vapor permeating speed ( $P'_{\text{H}_2\text{O}}$ ) of the hollow yarn membrane is at least  $0.5 \times 10^{-3} \text{ cm}^3 \text{ (STP)/cm}^2\text{-sec-cmHg}$ , (c) a ratio ( $P'_{\text{H}_2\text{O}}/P'_{\text{O}_2}$ ) between water vapor permeating speed and oxygen gas permeating speed of the hollow yarn membrane is at least 10, and (d) the tensile breaking elongation of the hollow yarn membrane after hot-water-treated in 100°C hot water for 50 hours is kept at at least 80% of that before heat-treated; especially a fuel cell-use humidifier wherein L/D is at least 1.8 when the effective length of the hollow yarn membrane element is L, and the inner diameter of the hollow yarn membrane element-mounting container D.

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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP03/06711

A. CLASSIFICATION OF SUBJECT MATTER  
Int.Cl.<sup>7</sup> H01M8/04, H01M8/10

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int.Cl.<sup>7</sup> H01M8/04, H01M8/10, B01D63/02, B01D53/22, B01D53/26,  
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho	1922-1996	Toroku Jitsuyo Shinan Koho	1994-2003
Kokai Jitsuyo Shinan Koho	1971-2003	Jitsuyo Shinan Toroku Koho	1996-2003

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2002-66262 A (Honda Motor Co., Ltd.), 05 March, 2002 (05.03.02), Full text; Figs. 1 to 8 (Family: none)	1-9
Y	EP 1118371 A1 (Ube Industries, Ltd.), 25 July, 2001 (25.07.01), Whole document & US 2002/0035922 A1 & JP 2001-269553 A & JP 2002-172311 A	1-9
Y	JP 2002-117879 A (Honda Motor Co., Ltd.), 19 April, 2002 (19.04.02), Par. Nos. [0010] to [0019]; Figs. 1 to 3 (Family: none)	4-9

☒ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

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"&" document member of the same patent family

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## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6210464 B1 (UBE Industries, Ltd.), 03 August, 2001 (03.08.01), Whole document; Figs. 1 to 5 & JP 2000-262838 A & DE 10011785 A1	5-9
Y	JP 2001-219025 A (UBE Industries, Ltd.), 14 August, 2001 (14.08.01), Full text; Figs. 1 to 5 (Family: none)	5-9
Y	US 2001/0021467 A1 (Suzuki et al.), 13 September, 2001 (13.09.01), Whole document; Figs. 1 to 14 & JP 2001-202978 A	6, 8-9
Y	US 2001/0015500 A1 (Shimanuki et al.), 23 August, 2001 (23.08.01), Whole document; Figs. 1 to 14 & JP 2001-201120 A	7-9
A	JP 63-236517 A (UBE Industries, Ltd.), 03 October, 1988 (03.10.88), (Family: none)	1-9
A	JP 7-328401 A (Mitsubishi Rayon Co., Ltd.), 19 December, 1995 (19.12.95), (Family: none)	1-9